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Agreement between physiotherapists rating scapular posture in multiple planes in patients with neck pain: Reliability study

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Abstract

Objective Evaluation of scapular posture is an integral component of the clinical assessment of painful neck disorders. The aim of this study was to evaluate agreement between therapist judgements of scapula posture in multiple biomechanical planes in individuals with neck pain.
Design Inter-therapist reliability study.
Setting Research laboratory.
Participants Fifteen participants with chronic neck pain.
Main outcome measures Four physiotherapists recorded ratings of scapular orientation (relative to the thorax) in five different scapula postural planes (plane of scapula, sagittal plane, transverse plane, horizontal plane, and vertical plane) under four test conditions (at rest, and during three isometric shoulder conditions) in all participants. Inter-therapist reliability was expressed using both generalized and paired kappa coefficient.
Results Following adjustment for expected agreement and the high prevalence of neutral ratings (81%), on average both the generalised kappa (0.37) as well as Cohen's Kappa for the two therapist pairs (0.45 and 0.42) demonstrated only slight to moderate inter-therapist reliability.
Conclusions The findings suggest that ratings of scapular posture in individuals with neck pain by visual inspection has only slight to moderate reliability and should only be used in conjunction with other clinical tests when judging scapula function in these patients.

Keywords: Agreement; Inter-therapist; Kappa; Posture; Reliability; Scapular

Introduction

Evaluation of scapular function is an integral component of the clinical examination of a patient with mechanical neck pain [1]. It is considered an important assessment point as scapular dysfunction is thought to perpetuate mechanical strain to pain sensitive cervical spine structures due to shared

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muscle attachments between the scapula and cervical spine [2,3]. In support of this there has been some initial evidence of altered scapular posture at rest and during elevation of the upper limb in some individuals with neck pain compared to healthy controls [4–6]. There are also studies that show an association between axioscapular muscle impairment and neck pain [7–10]. While there are many proposed methods to evaluate elements of scapular function in clinical practice [11] usually the initial assessment point is to observe for aberrant scapular alignment [1,12,13] commonly referred to as scapular dyskinesis [14].

Visual ratings of scapular posture have the advantage of being time efficient and of no cost. Although they are dependent on the subjective ratings of clinicians and lack the quantitative accuracy of 3-dimensional tracking devices [15–17] they do appear to be clinically informative [8,18]. However many potential sources of error exist. Primarily there is a lack of consensus regarding what constitutes 'normal' scapular posture [11,19] and as such disagreement is inevitable when judgements are made regarding abnormality. This uncertainty that is underpinned by unclear margins of normal/abnormal scapula posture is probably reflected in the modest findings of inter-therapist reliability studies utilising visual ratings of scapular posture [13,20–24].

We postulate that visual ratings of scapular posture may have better utility if ratings are divided and judged in multiple planes of reference [25,26] consistent with contemporary biomechanical descriptions of scapular and clavicular kinematics [15,27]. Potentially separate evaluation of scapular posture in specific planes of reference may improve agreement between therapists regarding scapula posture in clinical practice. Our earlier studies using this approach to evaluate scapular posture in multiple planes of reference has not supported this postulation demonstrating on average only fair to moderate intra-therapist [26] and inter-therapist [25] reliability in healthy individuals. We haven't as yet tested the reliability of this approach in a clinical population. Therefore the purpose of this study was to evaluate the inter-therapist reliability of physiotherapist's judgements of scapular posture in multiple planes of reference in individuals with chronic neck pain during upper limb tasks. It is anticipated that the findings will further define the scope of this form of assessment in the clinical management of patients with musculoskeletal conditions of the upper quadrant such as neck pain.

Methods

Design

Inter-therapist reliability study of four physiotherapists independently rating scapular posture in individuals with mechanical neck pain. Physiotherapists performing the ratings were all undertaking a post-graduate master's degree in musculoskeletal physiotherapy and had a mean 4.25 years (range 2.5 to 7 years) experience. Participants in the study were blinded to the intention of the study.

Participants and setting

Fifteen volunteers (5 males and 10 females) with chronic mechanical neck pain participated in the study and had a Mean (SD) age of 29.2 ± 11.8 years, body mass index of $23.2 \pm 3.5\,kg/m^2$, and Neck Disability Index [28] score of 14.1 ± 6.6 out of a possible 50 points.

Participants were included if they were aged between 18 and 60 years, reported neck pain of greater duration than 3 months, scored greater than 7/50 on the Neck Disability Index and demonstrated positive findings on a physical manual examination of the cervical spine (altered joint motion and painful reactivity to palpation) [29]. The study was undertaken in a clinical research laboratory setting.

Participants were excluded from the study if they demonstrated a painful disorder of the shoulder girdle such as subacromial impingement, prior surgery in neck or shoulder, symptoms suggestive of a radiculopathy or positive findings on a neurological examination, or marked deviations in thoracic posture such as a significant kyphotic or scoliotic posture. These criteria were to limit recruitment to those participants appropriate for a diagnostic label of mechanical neck pain of idiopathic origin such that a specific lesion in cervical structures had not been identified or cervical radiculopathy was not present [30] or participants did not demonstrate concurrent conditions such as painful shoulder girdle disorders or significant postural abnormalities of the spine.

Participants were recruited within the university and general community through electronic and written advertisements. Ethical approval for the study was granted by the Institutional Human Research Ethics Committee and all procedures were conducted according to the Declaration of Helsinki. Participants provided informed consent.

Outcomes

Posture of the scapula was rated in five different postural planes (Table 1, Fig. 1) in an identical method to that described in our previous studies [25,26]. Judgements of scapula posture were made relative to the thorax consistent with contemporary descriptions of scapular kinematics [15,27]. Therapists nominated one out of a possible three (middle rating always neutral) ordinal ratings for each of the five postural planes (Table 1) [26] based on literature describing 'normal' resting scapular posture [19,31]. Ratings either side of the 'neutral' representing deviation of the scapular towards opposite directions within the plane. All therapists were familiar with this assessment method prior to commencing the study and one practice session with the principal researcher was undertaken before the commencement of the data collection period to ensure all